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The bloodstream as a critical site to discover environmental causes for disease

Bio-monitoring studies have revealed that various human populations, including children, are exposed to environmentally abundant non-essential metals/metalloid species, such as cadmium, lead, mercury and arsenic. It is unclear, however, if the chronic low level exposure to some of these inorganic pollutants—over a lifetime—may be linked to the etiology of certain human diseases. Since health care costs related to chronic human diseases are increasing, the establishment of functional connections between exposure to inorganic pollutants and diseases is viewed by many as one of the greatest challenges in the post-genomic era. Uncovering the underlying biochemical mechanisms, however, represents a truly monumental task. Conceptually, this quest requires a more detailed understanding of the toxicological interactions of the aforementioned inorganic pollutants in the bloodstream as this ultimately determines which metal species will interact with toxicological target organs. Owing to the inherent complexity that is associated with the analysis of blood, not much is known about the fate of toxic metal species therein. We develop and apply novel analytical tools that can provide new insight to better understand these elusive interactions in blood plasma and red blood cell lysate at the molecular level. An overview of some recent results which highlight the applicability of the developed analytical tools will be presented.

Biography

Jürgen Gailer received his PhD from Karl-Franzens Universität Graz, Austria in 1997 and then completed Post-doctoral studies at the University of Arizona (Tucson, US; Erwin Schrödinger Fellow) and the GSF National Research Center for Environment and Health (Munich, Germany; Alexander von Humboldt Fellow). In 2002, he joined Boehringer Ingelheim Austria (Biopharmaceutical Production) where he was Team Leader for the downstream processing. He joined the Department of Chemistry, University of Calgary in 2004 where he currently is an Associate Professor and has a co-appointment in the Environmental Science Program.

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